評価対象論文リスト（要因：体格[肥満・やせ]、アウトカム：糖尿病）

評価判定日：2023/8/24

①既存の系統的レビュー・メタ解析・統合解析

1	Vazquez G, Duval S, Jacobs DR, Silventoinen K. Comparison of body mass index, waist circumference, and waist/hip ratio in predicting incident diabetes: a meta-analysis. Epidemiologic Reviews. 2007;29(1):115-128. doi:10.1093/epirev/mxm008
2	Cloostermans L, Wendel-Vos W, Doornbos G, et al. Independent and combined effects of physical activity and body mass index on the development of Type 2 Diabetes – a meta-analysis of 9 prospective cohort studies. Int J Behav Nutr Phys Act. 2015;12(1):147. doi:10.1186/s12966-015-0304-3
3	Hartemink N, Boshuizen HC, Nagelkerke NJD, Jacobs MAM, Van Houwelingen HC. Combining risk estimates from observational studies with different exposure cutpoints: a meta-analysis on body mass index and diabetes type 2. American Journal of Epidemiology. 2006;163(11):1042-1052.
4	Boffetta P, McLerran D, Chen Y, et al. Body mass index and diabetes in asia: a cross-sectional pooled analysis of 900,000 individuals in the asia cohort consortium. Zhang C, ed. PLoS ONE. 2011;6(6):e19930. doi:10.1371/journal.pone.0019930
5	Nyamdorj R, Pitkäniemi J, et al. Ethnic comparison of the association of undiagnosed diabetes with obesity. Int J Obes. 2010;34(2):332-339.
6	Abdullah A, Peeters A, De Courten M, Stoelwinder J. The magnitude of association between overweight and obesity and the risk of diabetes: A meta-analysis of prospective cohort studies. Diabetes Research and Clinical Practice. 2010;89(3):309-319. doi:10.1016/j.diabres.2010.04.012

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7	Kuwabara M, Kuwabara R, Niwa K, et al. Different risk for hypertension, diabetes, dyslipidemia, and hyperuricemia according to level of body mass index in japanese and american subjects. Nutrients. 2018;10(8):1011. doi:10.3390/nu10081011
8	Okada H, Hamaguchi M, Habu M, et al. Association between variability in body mass index and development of type 2 diabetes: Panasonic cohort study. BMJ Open Diab Res Care. 2021;9(1):e002123. doi:10.1136/bmjdrc-2021-002123
9	Sasai H, Sairenchi T, Iso H, et al. Relationship between obesity and incident diabetes in middle-aged and older japanese adults: the ibaraki prefectural health study. Mayo Clinic Proceedings. 2010;85(1):36-40. doi:10.4065/mcp.2009.0230
10	Ishikawa-Takata K, Ohta T, Moritaki K, Gotou T, Inoue S. Obesity, weight change and risks for hypertension, diabetes and hypercholesterolemia in Japanese men. Eur J Clin Nutr. 2002;56(7):601-607. doi:10.1038/sj.ejcn.1601364
11	Seki A, Takigawa T, Ito T, Fukuoka E, Takahashi K, Kira S. Obesity and the risk of diabetes mellitus in middle-aged Japanese men. Published online October 2002. doi:10.18926/AMO/31704
12	Sanada H, Yokokawa H, Yoneda M, et al. High body mass index is an important risk factor for the development of type 2 diabetes. Intern Med. 2012;51(14):1821-6. doi: 10.2169/internalmedicine.51.7410.
13	Heianza Y, Kato K, Kodama S, et al. Risk of the development of Type 2 diabetes in relation to overall obesity, abdominal obesity and the clustering of metabolic abnormalities in Japanese individuals: does metabolically healthy overweight really exist? The Niigata Wellness Study. Diabet Med. 2015;32(5):665-672. doi:10.1111/dme.12646
14	Someya Y, Tamura Y, Kohmura Y, et al. A body mass index over 22 kg/m2 at college age is a risk factor for future diabetes in Japanese men. Suemoto CK, ed. PLoS ONE. 2019;14(1):e0211067. doi:10.1371/journal.pone.0211067
15	Tatsumi Y, Ohno Y, Morimoto A, Nishigaki Y, Mizuno S, Watanabe S. Age differences in the risk of diabetes incidence according to body mass index level in Japanese women. Obesity Research & Clinical Practice. 2013;7(6):e455-e463. doi:10.1016/j.orcp.2012.05.001
16	Kuwahara K, Uehara A, Kurotani K, et al. Association of cardiorespiratory fitness and overweight with risk of type 2 diabetes in japanese men. Gong Y, ed. PLoS ONE. 2014;9(6):e98508. doi:10.1371/journal.pone.0098508
17	Ohnishi H, Saitoh S, Takagi S, et al. Incidence of type 2 diabetes in individuals with central obesity in a rural japanese population. Diabetes Care. 2006;29(5):1128-1129. doi:10.2337/dc06-0222
18	Nagaya T, Yoshida H, Takahashi H, Kawai M. Increases in body mass index, even within non-obese levels, raise the risk for Type 2 diabetes mellitus: a follow-up study in a Japanese population. Diabetic Medicine. 2005;22(8):1107-1111. doi:10.1111/j.1464-5491.2005.01602.x

■系統的レビュー・メタ解析・統合解析

No	Author	Title	Year	Category	Relative risk (95% CI)	Magnitude of association
1	Vazquez, G., et al	Comparison of body mass index, waist circumference, and waist/hip ratio in predicting incident diabetes: a meta-analysis	2007	per standard deviation of body mass index	1.87 (1.67-2.10)	↑↑↑
2	Cloostermans, L., et al	Independent and combined effects of physical activity and body mass index on the development of Type 2	2015	18.5 ≤BMI <25 kg/m2 25 ≤ BMI <30 kg/m2 BMI ≥30 kg/m2	Ref 2.33 (1.95-2.78) 6.10 (4.63-8.04)	 ↑↑↑ ↑↑↑
3	Hartemink, N., et al	Combining risk estimates from observational studies with different exposure cutpoints: a meta-analysis on body mass index and diabetes type 2	2006	**Method 1** Fixed effect model (1 unit increase) Random effect model (1 unit increase) **Method 2** Fixed effect model (1 unit increase) Random effect model (1 unit increase) **Method 3** Fixed effect model (1 unit increase) Random effect model (1 unit increase)	 0.188 (0.184, 0.192) 0.163 (0.144, 0.182) 0.207 (0.203, 0.212 0.171 (0.152, 0.190) 0.201 (0.197, 0.205) 0.168 (0.150, 0.186)	 ↑↑↑ (対数変換した値を表記している。1.2倍程度)
4	Boffette, P., et al	Body mass index and diabetes in Asia: a cross-sectional pooled analysis of 900,000 individuals in	2011	BMI 22.5–24.9 BMI <15.0 BMI 35.0-50.0	Ref 0.58 (0.31, 0.76) 2.23 (1.86, 2.67)	 ↓↓ ↑↑↑
5	Nyamdorj, R., et al	Ethnic comparison of the association of undiagnosed diabetes	2010	1s.d. increase	0.45 (0.40-0.49) in men 0.47 (0.43-0.51) in women	↑↑↑
6	Abdullah, A., et al	The magnitude of association between overweight and obesity and the risk of diabetes: a meta-analysis of prospective cohort studies	2010	Over weight BMI 25-29.99 Obesity BMI >=30	2.99 (2.42, 3.72) 7.19 (5.74, 9.00)	↑↑↑ ↑↑↑

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No	Author	Title	Year	Study period	Number of subjects for analysis	Source of subjects	Event followed	Definitions	Number of incident cases or deaths	Participant's race	Category	Number among cases	Relative risk (95%CI)	p for trend	Confounding variables considered	Magnitude of association
7	Kuwabara, M., et al	Different Risk for Hypertension, Diabetes, Dyslipidemia, and Hyperuricemia According to Level of Body Mass Index in Japanese and American Subjects	2018	2004-2010	90,047	An international hospital	Prevalence	taking glucose lowering therapies or a glycated hemoglobin (HbA1c) concentration of >=6.5%	3781	Japanese	per 1 kg/m2 increased Lean (BMI<18.5 kg/m2) Normal(18.5 =<BMI < 25 kg/m2 Overweight(25 =<BMI < 30 kg/m2) Obesity(30 =<BMI < 35 kg/m2) Severe obesity(BMI>=35 kg/ m2)	 NA	1.17 (1.16–1.18) 0.46 (0.41–0.52) Ref. 1.80 4.94 15.73	<0.001 NA	age, sex, smoking and drinking habits, chronic kidney disease, and other diseases (hypertension, dyslipidemia, and hyperuricemia).	↑ ↑↑↑
8	Okada, H., et al	Association between variability in body mass index and development of type 2 diabetes: Panasonic cohort study	2021	2008-2018	19,412	Panasonic cohort study	Incidence	Type 2 diabetes was defined by fasting plasma glucose level ≥126 mg/dL, having a self-	416	Japanese	CV of BMI: <1.56% 1.56-2.03% 2.04-2.65% >2.56%	 NA	Ref. 1.16 (0.83–1.62) 1.17 (0.84–1.64) 1.51 (1.10–2.08)	 	age, sex, BMI at baseline, change in BMI after data collection, systolic blood pressure (SBP), levels of low-density lipoprotein (LDL) cholesterol, high-	 – – ↑↑
9	Sasai, H., et al	Relationship between obesity and incident diabetes in middle-aged and older Japanese adults: the Ibaraki Prefectural Health Study	2010	1993-2006	61,415	communities in Ibaraki prefecture	Incidence	a fasting blood glucose concentration of 126 mg/dL or greater, a nonfasting blood glucose concentration of 200 mg/dL or greater, or initiation of treatment for diabetes mellitus	4429	Japanese	Men Age 40-59 <25.0 25.0-29.9 >=30.0 Age 60-79 <25.0 25.0-29.9 >=30.0 Women Age 40-59 <25.0 25.0-29.9 >=30.0 Age 60-79 <25.0 25.0-29.9 >=30.0	 395 298 21 968 360 21 633 370 106 694 478 77	 Ref. 1.42 (1.21–1.67) 1.40 (0.89–2.20) Ref. 1.13 (0.99–1.29) 1.26 (0.81–1.96) Ref. 1.20 (1.05–1.37) 2.50 (2.01–3.11) Ref. 1.30 (1.15–1.47) 1.80 (1.41–2.30)	 0.002 0.04 	age, blood glucose, fasting status (yes/no), systolic blood pressure, antihypertensive medication use (yes/no), total cholesterol, high-density lipoprotein cholesterol, log-transformed triglycerides, lipid medication use (yes/no), smoking status (never, ex-smoker, current <20 or ≥20 cigarettes/day), alcohol intake (none, occasionally, daily <60 or ≥60 g/d), and BMI change from baseline to the end of the year follow-up	 – – ↑↑↑ ↑↑
10	Ishikawa-Takata, K., et al	Obesity, weight change and risks for hypertension, diabetes and hypercholesterolemia in Japanese men	2002	1994-1998	4385 men	Employees of a company	Incidence	FBG >=126 mg/dL or taking madication for DM	242	Japanese	Loss or gain <=2.0 kg Gain >2.0 kg Loss >2.0 kg < BMI 18.5 18.5 =< BMI <19 19 =< BMI <20 20 =< BMI <21 21 =< BMI <22 22 =< BMI <23 23 =< BMI <24 24 =< BMI <25 25 =< BMI <26 26 =< BMI <27 27 =< BMI <28 28 =< BMI <29 29 =< BMI <30 30 =< BMI <35	144 63 35 8 6 20 25 23 26 35 26 24 14 11 8 8 8	Ref. 1.14 (0.85–1.54) 1.16 (0.80–1.69) Ref. 1.39 (0.48–4.02) 1.35 (0.59–3.08) 1.36 (0.61–3.02) 0.97 (0.43–2.18) 0.98 (0.44–2.16) 1.47 (0.68–3.19) 1.32 (0.59–2.94) 1.71 (0.76–3.82) 1.52 (0.63–3.64) 1.96 (0.78–4.91) 1.85 (0.69–4.95) 5.16 (1.92–13.80) 5.25 (1.96–14.04)	NA NA	Age, BMI at baseline, smoking, alcohol intake, family history of DM, FBG at baseline. Age, smoking, alcohol intake, family history of DM, FBG at baseline.	– – – ↑↑↑
11	Seki, A., et al	Obesity and the risk of diabetes mellitus in middle-aged Japanese men	2002	1975-1998	127 men	worksite-based historical cohort in Okayama	Incidence	subjects whose FPG value was126mg/dl or higher or who had already been diagnosed as diabet	NA	Japanese	at age 40 18.5-22.9 23.0-24.9 ≥25.0 at age 45 18.5-22.9 23.0-24.9 ≥25.0 at age 50 18.5-22.9 23.0-24.9 ≥25.0 at age 55 18.5-22.9 23.0-24.9 ≥25.0	 NA 	 Ref. 2.11 (0.93–4.81) 2.88 (1.27–6.51) Ref. 1.36 (0.55–3.32) 2.52 (1.15–5.62) Ref. 2.52 (1.01–6.30) 3.27 (1.38–7.70) Ref. 1.65 (0.66–4.15) 2.23 (0.92–5.37)	 NA 	 NA 	 ↑↑ ↑↑↑ – ↑↑↑ ↑↑↑ ↑↑↑ ↑ ↑↑

No	Author	Title	Year	Study period	Number of subjects for analysis	Source of subjects	Event followed	Definitions	Number of incident cases or deaths	Participant's race	Category	Number among cases	Relative risk (95%CI)	p for trend	Confounding variables considered	Magnitude of association
12	Sanada, H., et al	High body mass index is an important risk factor for the development of type 2 diabetes	2012	1994(-1996)-2004(-2006)	1554 men and women	two adjacent hospitals	Incidence	FPG >=126 mg/dL, 2-h measured value for 75 g-OGTT >=200 mg/dL and/or initiation of treatment for type 2 diabetes within the previous year.	135	Japanese	<25.0 25.0-27.4 >=27.5	49 57 29	Ref. 3.12 (2.09–4.66) 3.80 (2.36–6.12)	<0.01	age, sex, SBP, DPB, TC, HDLC, TG, UA, FPG, 2h-PG and HOMA-IR	↑↑↑ ↑↑↑
13	Heianza, Y., et al	Risk of the development of Type 2 diabetes in relation to overall obesity, abdominal obesity and the clustering of metabolic abnormalities in Japanese individuals: does metabolically healthy overweight really exist? The Niigata Wellness Study	2015	2006-2011	29,564	health screening examination by the Niigata Association of Occupational Health in Niigata	Incidence	Diagnosis of Type 2 diabetes was made by a fasting glucose level ≥ 7.0 mmol/l, self-reported history of previously diagnosed diabetes or HbA1c≥ 48 mmol/mol (≥ 6.5%)	1188	Japanese	Q1, normal weight Q1, overweight Q2, normal weight Q2, overweight Q3, normal weight Q3, overweight Q4, normal weight Q4, overweight Q5, normal weight Q5, overweight	NA	Ref. 2.32 (1.50–3.59) 3.23 (2.55–4.10) 5.00 (3.77–6.63) 6.84 (5.36–8.71) 12.9 (10.0–16.5) 15.1 (11.4–20.1) 21.0 (15.9–27.8) 24.4 (13.3–44.8) 43.5 (27.2–69.4)		age, sex, smoking habit and physical activity habit	↑↑↑ ↑↑↑ ↑↑↑ ↑↑↑ ↑↑↑ ↑↑↑ ↑↑↑ ↑↑↑ ↑↑↑
14	Someya, Y., et al	A body mass index over 22 kg/m2 at college age is a risk factor for future diabetes in Japanese men	2019	(1956 -1991) to (2007 and 2017)	661	Male alumni of the Physical Education School of Juntendo University	Incidence	Self-reported	56	Japanese	<21.0 kg/m2 21.0–22.0 kg/m2 22.0–23.0 kg/m2 >=23.0 kg/m2	7 13 18 18	Ref. 1.77 (0.68–4.30) 2.42 (1.00–5.84) 2.53 (1.06–6.07)	0.03	Age at graduation, year of graduation, and smoking.	↑ ↑↑↑ ↑↑↑
15	Tatsumi, Y., et al	Age differences in the risk of diabetes incidence according to body mass index level in Japanese women	2013	1990-2006	4725 women	Those who underwent medical examinations in Tanno and Sobetsu in Hokkaido	Incidence	FPG >=7.0 mmol/l (126 mg/dl), random plasma glucose >=11.1 mmol/l(200 mg/dl), HbA1c >=6.5%, or medical treatment for DM	394	Japanese	BMI 18.5—22.9 BMI < 18.5 BMI 23.0—24.9 BMI >= 25.0	118 17 85 174	Ref. 1.74 (1.04–2.92) 1.06 (0.80–1.42) 1.88 (1.47–2.41)	NA	Age, blood glucose level, fasting status, SBP, total cholesterol, logtransformed TG, family history of DM, smoking, habitual drinking, exercise habit	↑↑ – ↑↑
16	Kuwahara, K., et al	Association of cardiorespiratory fitness and overweight with risk of type 2 diabetes in Japanese men	2014	2003-2011	3,523 male	(J-ECOH) Study	Incidence	Type 2 diabetes was diagnosed as a fasting plasma glucose >=126 mg/dl (7.0 mmol/l),	199	Japanese	BMI <25 BMI >=25	132 67	Ref. 2.04 (1.56–2.83)	<0.001	age, smoking status, alcohol drinking, sleep duration, hypertension, family history of diabetes, and fitness for BMI	↑↑↑
17	Ohnishi, H., et al	Incidence of type 2 diabetes in individuals with central obesity in a rural Japanese population: The Tanno and Sobetsu study	2006	1994-2004	871 (348 men and 523 women)	Those who underwent a health check-up at one central hospital in Nagano.	Incidence	FPG >=126 mg/dl or taking medication for DM	65	Japanese	WC <85 cm (men) or <90 cm (women) WC >=85 cm (men) or >=90 cm (women) BMI <25 BMI >=25	38 27 35 30	Ref. 2.07 (1.03–4.16) Ref. 1.53 (0.83–2.83)	<0.05 NA	Age, sex, total cholesterol, SBP, smoking, overall obesity Age, sex, total cholesterol, SBP, smoking, central obesity	↑↑↑ ↑
18	Nagaya, T., et al	Increases in body mass index, even within non-obese levels, raise the risk for Type 2 diabetes mellitus: a follow-up study in a Japanese population	2005	1988-1991 (baseline) to 2001	25199 (16 829 men and 8370 women)	Data were taken from medical records from voluntary re-attendants for a check-up, in the Gifu Prefecture	Incidence	Fasting serum glucose ≥ 7.00 mmol/l (126 mg/dl) and/or under medical treatment for diabetes mellitus by questionnaire	1093 (869 men and 224 women)	Japanese	**Men** 1st, 15.0–19.7 2nd, 19.8–20.8 3rd, 20.9–21.6 4th, 21.7–22.3 5th, 22.4–22.9 6th, 23.0–23.6 7th, 23.7–24.3 8th, 24.4–25.1 9th, 25.2–26.3 10th, 26.4–38.5 Trend for BMI (per 1 kg/m2) **Women** 1st, 14.9–19.1 2nd, 19.2–20.0 3rd, 20.1–20.7 4th, 20.8–21.3 5th, 21.4–21.9 6th, 22.0–22.6 7th, 22.7–23.4 8th, 23.5–24.3 9th, 24.4–25.9 10th, 26.0–43.2 Trend for BMI (per 1 kg/m2)	27 44 40 50 62 77 108 99 145 217 6 11 8 14 13 16 25 26 41 64 	Ref. 1.55 (0.96–2.50) 1.56 (0.96–2.54) 1.85 (1.16–2.95) 2.46 (1.56–3.86) 2.91 (1.88–4.52) 4.07 (2.66–6.21) 3.98 (2.60–6.10) 5.55 (3.67–8.38) 8.68 (5.81–13.0) 1.26 (1.24–1.29) Ref. 1.91 (0.71–5.17) 1.38 (0.48–3.99) 2.34 (0.90–6.08) 2.07 (0.79–5.44) 2.70 (1.06–6.90) 3.98 (1.63–9.69) 4.75 (1.95–11.5) 7.29 (3.10–17.2) 12.2 (5.29–28.2) 1.25 (1.21–1.29)	<0.001 <0.001	Age, smoking, drinking, exercise and education	↑ ↑ ↑↑ ↑↑↑ ↑↑↑ ↑↑↑ ↑↑↑ ↑↑↑ ↑↑↑ ↑ ↑ – ↑↑ ↑↑ ↑↑↑ ↑↑↑ ↑↑↑ ↑↑↑ ↑↑↑ ↑